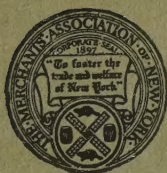


THE MERCHANTS' ASSOCIATION OF NEW YORK
Industrial Bureau

Staten Island
New York City

Its Industrial Resources and
Possibilities



NEW YORK
1922

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FOREWORD

Staten Island, or the Borough of Richmond, is in area the third largest borough of New York City. It stands at the entrance of the Port of New York. Nevertheless it is still, for the most part, a rural community.

The purpose of this report is to give an accurate picture of Staten Island's industrial resources and possibilities.

The present report is the second in a series dealing with the industrial districts of New York City. The first was devoted to the Newtown Creek Industrial District, a highly developed manufacturing section lying near the center of the City, but still offering several hundred acres of undeveloped industrial sites.

The publication of these reports is in accordance with the policy of The Merchants' Association of New York to encourage the sound industrial development of New York City and vicinity.

Although New York is the world's largest industrial center, it now utilizes only a portion of its industrial territory. In the rapid and inevitable expansion that is taking place The Merchants' Association of New York, through its Industrial Bureau, desires to be of assistance in advising prospective manufacturers concerning the industries which can and those which cannot be profitably located in New York, as well as the locations which are best suited to industries coming into this district.

The Association, therefore, invites inquiries regarding the merits of a location on Staten Island or any other section of the New York Metropolitan District.

THE MERCHANTS' ASSOCIATION OF NEW YORK,
233 Broadway, New York City.

MARTIN DODGE, *Manager,*
Industrial Bureau.

January, 1922.



AIRPLANE VIEW OF THE \$20,000,000 PIER PROJECT AT STAPLETON, STATEN ISLAND. THESE GREAT PIERS ALONE PROVIDE FIVE MILES OF WHARFAGE AT THE CITY'S GATEWAY

CHAPTER I

SUMMARY AND CONCLUSIONS

Staten Island, or the Borough of Richmond, is one of New York City's greatest undeveloped industrial assets. Its navigable waterfront, extensive piers, direct rail connections with the great trunk lines, its proximity to the unequalled markets of the Metropolitan District and its wide areas of relatively inexpensive land available for industrial purposes, form a combination of advantages which can hardly be duplicated anywhere else on the Atlantic seaboard.

The area of Staten Island is 57 square miles. It lies at the very entrance of New York Harbor, five miles south of Manhattan. It has thirty-five miles of shore front, more than half of which faces upon deep water. Although nearly three times as large as Manhattan, Staten Island has only one-twentieth of its population. In fact, many sections of the Borough are still rural rather than urban.

Staten Island has twenty-three miles of double-track railroad, affording direct transportation facilities to all points inland, and is one of the few sections of New York City which can still offer undeveloped industrial sites combining the advantages of both rail and water transportation.

The areas ready for industrial development are extensive. Continuous tracts of more than 100 acres are available. Prices range from \$500 to \$5,000 an acre and compare very favorably with values in other parts of the City.

Shipping Facilities	The Island's location at the entrance of the Harbor gives it distinct shipping advantages. Its great piers lie near the regular shipping channels.
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Oversea vessels using these piers need not be piloted through the waters of Upper Bay. This permits of a considerable saving in running time and makes Staten Island in effect appreciably nearer the ports of Europe than most other sections of the City.

The east shore of the Island facing the Narrows affords remarkable opportunities for pier developments. The Narrows is the main entrance to upper New York Bay. The pierhead lines lie 1,800 feet

from the shore. This permits the construction of docks of enormous size. At the present time the City is building here twelve great docks, each one of which is more than 1,000 feet in length, comprising a pier development of the most modern character and extensive proportions.

Rail facilities on Staten Island are furnished by the Staten Island Rapid Transit Railway, a subsidiary of the Baltimore & Ohio Railroad. This road has constructed a freight bridge over the narrow channel which separates the Island from New Jersey. By this means direct rail connections are made with the Pennsylvania, Lehigh Valley and Central Railroad of New Jersey, and thence to the other lines entering New York. This bridge is the only one connecting New York City immediately with the mainland to the west. It gives Staten Island an obvious transportation advantage over sections of the City which are dependent upon floats and lighters for similar shipping needs.

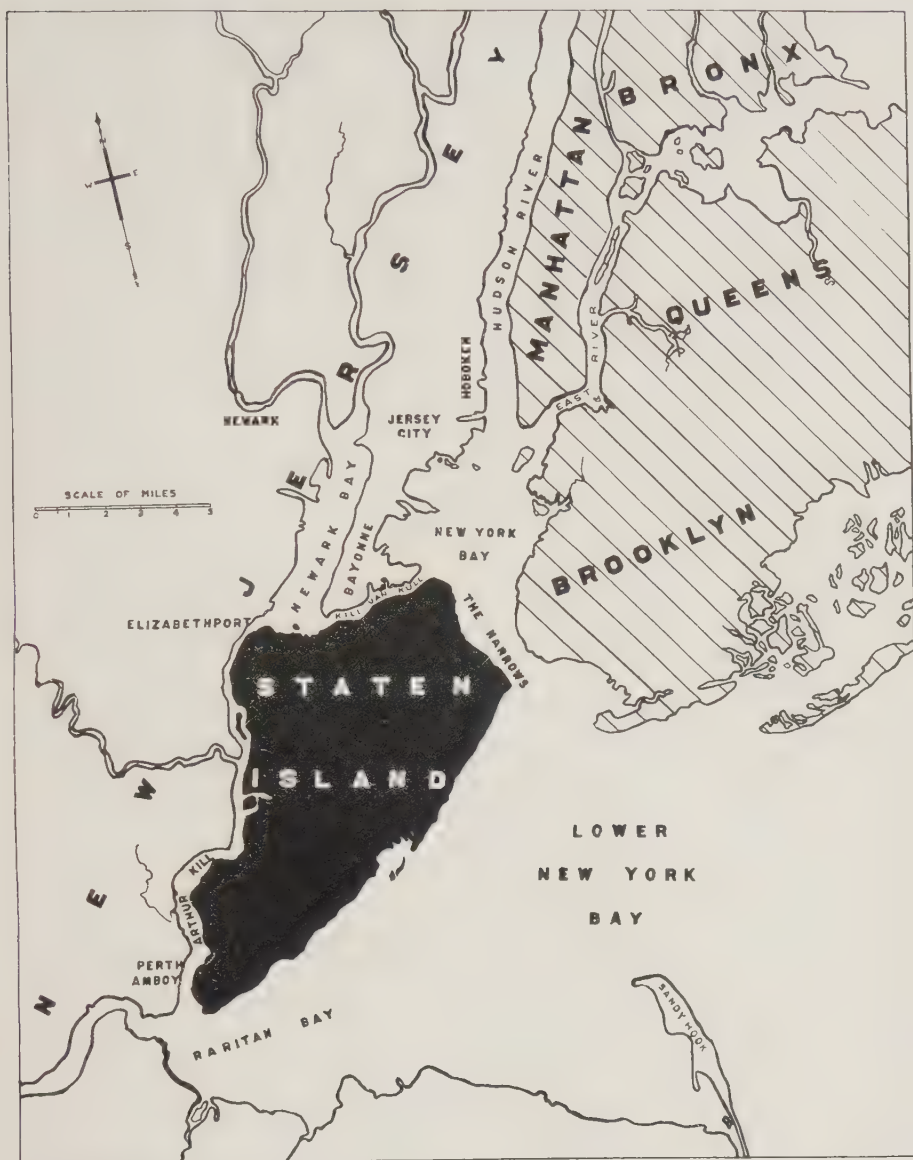
In addition to direct rail transportation facilities, the Island is supplied with ample ferry service. Six ferry systems connect it with Brooklyn, Manhattan and the New Jersey mainland, and a new system designed especially to carry vehicles between Staten Island and Manhattan has been authorized by the City, and will be put in operation in the near future. Manufacturers in the Borough of Richmond are within easy reach by motor truck of the unparalleled market of the New York Metropolitan District, embracing about 8,000,000 population.

A freight and passenger tunnel, to be built under the Narrows, connecting Staten Island with Brooklyn and thence to all the other boroughs of New York, has been authorized. This project was approved in May, 1921, by the New York State Legislature. The law authorizing the tunnel requires that it provide for both freight and passenger traffic and that construction be started within two years.

With an all-rail connection to the mainland and with waterfront terminal facilities of the most up-to-date character, Staten Island offers exceptional opportunities for manufacturers who desire to locate within the metropolitan area.

Industries There are 120 industrial plants in Richmond Borough employing five or more persons. Of these twenty-nine normally employ 100 or more workers. During the fiscal year ending June 30, 1921, the combined forces of these 120 plants in both office and shop were about 15,000

MAP I—STATEN ISLAND'S LOCATION AT THE ENTRANCE TO THE PORT OF NEW YORK.



This Location Gives Staten Island Unusual Natural Advantages
for Industry and Commerce

persons. Of this number nearly half were employed in eighteen shipbuilding and repair plants, which constitute Staten Island's most important industrial group. Aside from the shipbuilding plants, the largest group of workers is employed in the manufacture of building materials. The largest number of factories is engaged in the production of textiles and kindred products. There are twenty-seven such concerns employing an average of thirty-one persons per plant.

**Docks and
Warehouses**

In addition to Staten Island's manufacturing establishments, there are extensive docks and warehouses. Of these, the largest now in operation are those of the Baltimore & Ohio Railroad at St. George, of the American Dock Company at Tompkinsville, and of the Pouch Terminals, Inc., at Clifton. These facilities are being augmented by the City's enormous dock development mentioned above. The twelve new municipal piers located at Stapleton range in length from 1,050 to 1,130 feet—each long enough to accommodate the biggest steamer ever built. These piers will be able to berth at one time forty-eight vessels of ordinary length and their annual capacity is estimated at fourteen million tons of shipping. They will be amply equipped with freight-handling machinery of the most modern sort.

**Labor
Supply**

In 1920 the population of Staten Island was 116,531. The average density was 3.2 persons to the acre as compared with 163 to the acre on Manhattan and an average of 28 per acre for the entire City. Although more sparsely populated than the other boroughs, Staten Island has recently been growing twice as rapidly as the City as a whole. Between 1910 and 1920 it increased from 85,969 to 116,531, a growth of 35 per cent. This compares with a growth of 18 per cent for the City as a whole.

Manufacturers who locate on Staten Island should have no difficulty in building up an adequate labor supply. Housing conditions are favorable. In many parts of the Borough there are numbers of small frame houses which are admirably suited for working men's homes. As the Island has been settled since Colonial times there are many old established communities provided with good roads, churches, schools and clubs, which are factors of great importance to the working man. These communities readily lend themselves to expansion.

In addition to the labor supply living on Staten Island, manufacturers can and do tap the vast population areas adjoining the



THIS GREAT PLANT IS SIGNIFICANT OF STATEN ISLAND'S INDUSTRIAL
POSSIBILITIES.

Island. Millions of people live within commuting distance. In 1920 the six ferry systems running to Staten Island carried over 26 million passengers back and forth between this Borough and other sections of the Metropolitan District. Many of these passengers were commuters who came to the Island to work, but whose homes are in nearby sections of Greater New York.

**The North
Shore**

At the present time approximately one-half of the industrial concerns in Richmond are located along the north shore. This section of the Island has been steadily growing in industrial importance for many years and it will probably continue to expand during the coming decade at an even more rapid rate than in the past. The railroad tracks of the Baltimore and Ohio skirt this shore and a ship channel has been dredged along its entire length. Thus it is possible to secure sites having railroad facilities on one side and water facilities on the other.

Available building sites along the water's edge without rail facilities vary in price from 75c to \$2.50 per square foot. Along the railroad tracks industrial properties without water facilities range in size from one to thirty-five acres and in price from 15c to 40c per square foot. Sites combining both rail and water service are somewhat more expensive.

**The East
Shore**

The east shore of Richmond Borough will probably become important as a commercial rather than an industrial center. Already the shore front is lined with piers. A number of warehouses have been erected behind them and more will probably be built in the near future. However, as the tracks of the Baltimore and Ohio run along the entire shore the combination of rail, pier and warehouse facilities offers unusual attractions for industry, as well as commerce. Development is limited somewhat by the

City's building regulations and by the hills in the background. There remains, however, considerable territory that might be used for industrial purposes. Although much of this land has been already bought up by manufacturing concerns, a few waterfront and railroad properties are still available. Prices range from 20c to 80c per square foot.

The West Shore

By far the most extensive undeveloped areas on Staten Island situated upon deep water are located along the west shore. Up to the present time only a few plants have located along these dozen miles of waterfront. This is due primarily to the lack of railroad facilities. The immense potentialities of this section, however, are clearly seen by comparing the Staten Island and New Jersey shores of Arthur Kill. The New Jersey side, only one or two thousand feet away, is lined almost from one end to the other with large factories teeming with industry. Most of these plants have been built during the last few years since the construction of a railroad spur along that shore. A similar improvement on Staten Island is almost sure to bring an early utilization of the great resources along its shore.

Although the west shore of the Island will probably never fully develop until adequate railroad facilities are provided it might well be utilized even now by certain types of industries requiring large acreage with tide water advantages. Manufacturers transporting heavy tonnage to or from Europe or South America would find it greatly to their interest to locate in this section. A ship channel extends along the entire Kill. Moreover, the Baltimore and Ohio Railroad is willing to furnish a spur to any large concern locating within a reasonable distance of its present lines. Industrial sites of 100 acres or more can be secured. Such sites with waterfront facilities can be purchased at less than \$1,000 per acre. The maximum price would not exceed \$3,500 per acre.

The South Shore

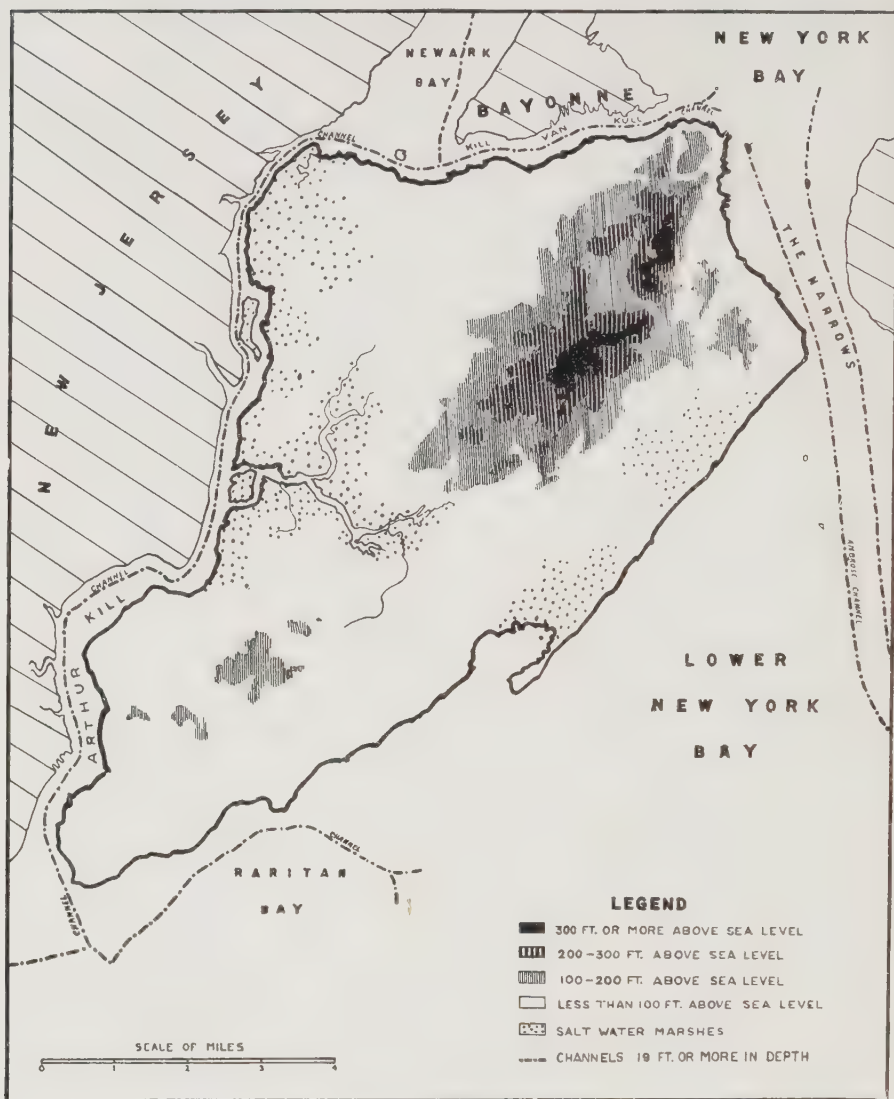
The future development of Staten Island's south coast is less certain than that of the west shore. From a commercial standpoint this shore has many natural advantages. It faces directly upon the Atlantic Ocean and is nearer in running time to the foreign ports of the world than almost any other section of New York City. Piers of great length can be erected along the waterfront. Because of its shallow and exposed shore, however, it has not yet developed either commercially or industrially. Extensive improvements are

necessary before it can be generally utilized for manufacturing and commercial purposes. A ship channel must be dredged, a break-water built, and more adequate rail facilities provided. Some of these improvements would require large expenditures and Federal legislation. Pending such improvements industrial concerns can advantageously locate on the railroad tracks of the Staten Island Rapid Transit Company, which runs the entire length of this coast about a mile or so from the water's edge. Here land can be secured at very reasonable rates. Representative prices range from one to three thousand dollars per acre.

The Future Although in the past Staten Island's industrial development has been slow, its expansion in the future is almost certain to be far more rapid. The fundamental reason for the Borough's retarded growth undoubtedly has been its comparative isolation. While this isolation has been more imaginary than real, it has been a powerful influence in limiting the Island's industrial development. The freight and passenger tunnel under the Narrows, which has already been authorized, would be a large factor in removing this defect.

The improvements now under way on Staten Island will, undoubtedly, lead to still further developments. For example, New York City officials have been holding conferences with representatives of the various railroads entering the Metropolitan District in order to study the engineering and transportation problems connected with the construction of the authorized tunnel under the Narrows. If certain railroads should decide to ship their freight to Brooklyn through this tunnel instead of by lighter it would mean much for the industrial growth of Richmond Borough. Moreover, the Port of New York Authority, which is a body recently created by the joint action of the Legislatures of New York and New Jersey to coordinate and unify the facilities of this Port, has recently made public its "Comprehensive Program," which includes a marginal railroad along the entire west shore of Staten Island. If the Port Authority's program should be adopted it would undoubtedly lead to a rapid industrial expansion along this shore. The Transit Commission has recently proposed the construction of a rapid transit tunnel connecting Staten Island with Manhattan via Brooklyn. Such a tunnel would further increase the accessibility of Staten Island to the rest of New York and also aid materially in its industrial development.

MAP II—STATEN ISLAND'S TOPOGRAPHY.



The Island's Elevation Ranges From Sea Level to an Altitude of 410 Feet—the Highest Point on the Atlantic Seacoast From Maine to Florida. Of the 35 Miles of Shore Front, 21 Are Upon Deep Water

CHAPTER II

STATEN ISLAND'S GEOGRAPHY

Strategic Location The Port of New York is the doorway of the Nation. Staten Island is at the threshold. The vast world commerce of New York, in its transit to and from the harbor, passes within a few hundred yards of the Island, which lies five miles south of the tip of Manhattan and constitutes the most southerly section of New York City.

In shape Staten Island resembles an inverted pear. Its greatest length is fourteen miles and its maximum width somewhat more than seven miles. The total area is 36,600 acres, or approximately 57 square miles—almost three times the area of the Borough of Manhattan, or nearly as large as Manhattan and The Bronx combined.

The Island is separated from New Jersey by Arthur Kill, or Staten Island Sound, a tidal waterway varying in width from 1,000 feet to one-half mile, and extending from Raritan Bay at the southern end of the Island to Newark Bay on the north, a distance of eleven miles. At the upper end of the Island the Borough is divided from the Bayonne peninsula by Kill van Kull, a waterway three miles long and approximately one-third of a mile in width, opening directly into New York Bay. The Island is separated from Brooklyn by the Narrows—a strait one mile wide and somewhat more than a mile in length, connecting upper and lower New York bays. It is through this strait that more than 10,000 overseas vessels pass annually with half the ocean tonnage of the country.

Unusual Natural Advantages This proximity to the established channels of the Nation's commerce makes Staten Island's position highly significant from an industrial and commercial standpoint. Not only is the Island closer to European and South American ports than most other parts of New York City, but its shore line lends itself admirably to the construction of enormous piers and docks to accommodate the largest vessels. Each of the twelve piers which the City of New York is just bringing to completion along the Narrows is about one-fifth of a mile long. There are few other

sections in New York City where piers of this size could be built.

Staten Island's proximity to the New Jersey mainland has made it possible to build a railroad freight bridge across Arthur Kill near the northern extremity and thus provide mainland transportation facilities to the south and west. This is a factor of great importance to the industry and commerce of the Island.

Varied Topography The topography of Staten Island is varied. There are valleys and marshlands, inlets and bays. A ridge of hills runs the length of the Island. At the northeastern section the land rises abruptly, at one point—Dongan Hills—reaching an altitude of 410 feet. This is the highest elevation on the Atlantic seacoast from Maine to Florida. This part of the Island does not lend itself to industrial development, but is ideal for residential purposes. Toward the south the hills become less marked, seldom exceeding 100 feet above sea level. The western shore is quite level and in many places marshy. Toward the middle this shore is deeply indented by a tide-water inlet known as Fresh Kills.

Valuable Clay Deposits Staten Island's geological formation is of more than usual interest from an industrial standpoint. The formation of the surface rock is traceable largely to the final period of glaciation. Much of the surface soil to be found on the Island was deposited by the last continental ice sheet. These deposits, which cover most of the Borough and range in thickness from 10 to 84 feet, consist of a red matrix or till, and in the southern part are mixed with a small portion of stony material. The glacial deposits are best seen at the numerous clay pits at Charleston (Kreischer-ville) and between Rossville and Fresh Kills in the southwestern section of the Island. Along the western coast these clay deposits underlie large sections of the Island. Some of the clay beds are of an unusually fine quality, and of sufficient commercial importance to have led to the establishment of a number of brick factories on the Island.

35 Miles of Waterfront The coast line of Richmond is one of its greatest assets, totaling 35 miles of waterfront measured along bulkhead lines. It is divided as follows: Along the Narrows from Fort Wadsworth to the St. George Ferry, 2.8 miles; St. George westward to the mouth of Arthur Kill, 5.7 miles; from the northern mouth of Arthur Kill to the southern tip of the Island (Ward's Point), 12.7

miles, and, finally, from Ward's Point to Fort Wadsworth, 14.2 miles.

The coast skirting the Narrows is generally known as the "east shore"; that from St. George to Arthur Kill as the "north shore"; along Arthur Kill as the "west shore" and the beach between Fort Wadsworth and the southern end of the Island as the "south shore." This is the sense in which these terms will be employed throughout the report.

Ship Channels

Except along the Narrows the waters surrounding the Island were by nature shallow. The Federal Government, however, has dredged ship channels along most of the shore until now 21.2 miles, or 60 per cent of the coast line, has a navigable waterfront.

Beginning at the southern end of the Island there is a channel nineteen feet deep at mean low tide and thirty feet wide, extending from deep water in Lower New York Bay to the mouth of Arthur Kill. From the lower end of Arthur Kill this channel connects with another twenty-five feet or more in depth extending northward to Newark Bay. This waterway was deepened to twenty-five feet under a Federal Act of March 4, 1913, which provided for a channel 400 feet wide and twenty-five feet deep, extending northward from the southern end of Arthur Kill to the southeastern section of Newark Bay—a distance of fourteen miles.

Through Kill van Kull there is a twenty-five-foot channel, now being deepened to thirty feet. Along the Narrows the shore is precipitous and self-dredging, the tides and currents preventing any deposit along this shore. South of this strait the coast slopes gradually and the water is shallow except at a few points, such as Great Kills and Prince's Bay. No ship channel has been dredged along this section.

One Inland Waterway

The one inland waterway of any size is Fresh Kills, located on the western side of the Island, which has only been dredged for a few hundred feet above its mouth. The absence of an adequate ship channel and railroad facilities in this section has limited its use for industrial purposes. In the future, however, it may develop into a waterway of commercial importance and become the "Newtown Creek" of Staten Island.



STATEN ISLAND HAS 18 SHIPYARDS



A VEGETABLE OIL REFINERY ON THE NORTH SHORE

CHAPTER III

STATEN ISLAND'S INDUSTRIES

Present Development

Staten Island is the least developed of the five Boroughs of New York City. In fact, to people who think of New York City in terms of skyscrapers, subways and congestion, it is difficult to paint a true picture of Staten Island. In many respects conditions are rural rather than urban. The fundamental reason for the Island's slow industrial development has been its isolation. With the exception of the freight bridge across Arthur Kill the Island can be reached only by boat.

Recent Growth

In spite of its comparative isolation, however, Staten Island within recent years has been rapidly growing in industrial importance. The Borough's excellent waterfront, together with its direct railroad transportation facilities to points west and south, have come more and more to attract new industrial enterprises.

This growth is likely to continue at an even more rapid rate in the future. One factor will be the City's enormous new pier development at Stapleton. This will especially attract manufacturers who export a large portion of their products or utilize imported raw materials.

In addition to these unusual shipping facilities the Island has all rail service to inland points in the United States. Also, the various ferry systems afford trucking facilities to all parts of the Metropolitan District—the largest consumers' market in the world.

Developed Shores

Compared with the rest of the Borough, the north and east shores of Staten Island are relatively well developed, the following communities practically adjoining one another: Rosebank, Clifton, Stapleton, Tompkinsville, St. George, New Brighton, Sailors Snug Harbor, Livingston, West New Brighton, Port Richmond, Tower Hill, Elm Park, Mariners Harbor and Arlington. All of these communities lie within a two-mile belt across the eastern and northern sections of the Island, amounting in area to about one-sixth of the total area of the Island and including about 80,000 persons, or 67 per cent of the total population. The average density of popu-

lation within this section is approximately 13 persons to the acre. This compares with 163 persons per acre in Manhattan.

**Rural
Sections**

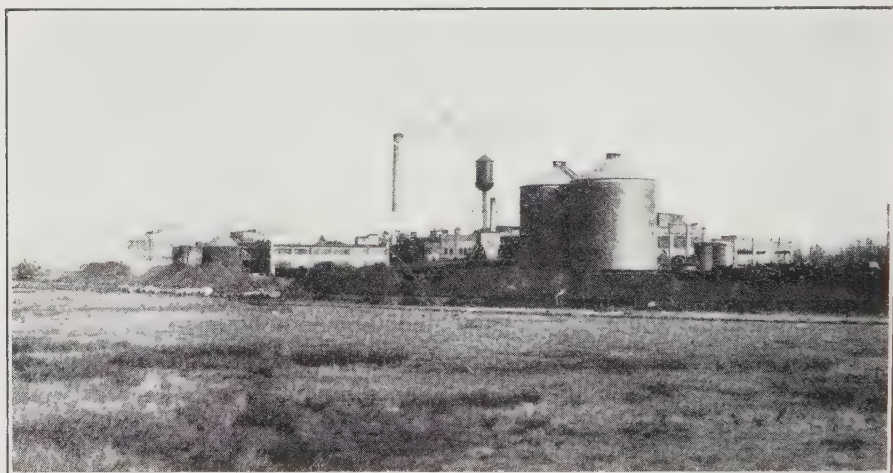
South of the two-mile belt the Island consists, to a large extent, of open country—farm lands, wooded areas, residential estates and the like—with a number of small hamlets interspersed.

Along the west shore the only towns are Linoleumville, just north of Fresh Kills, and Green Ridge, Rossville and Charleston, a few miles further south. At the southern tip of the Island is the village of Tottenville, with a population of several thousand, the largest town in the lower part of the Borough.

The south shore is more thickly populated. The Staten Island Rapid Transit Railway runs along this section about a mile from the shore, serving a number of villages. Those of any industrial importance are Tottenville, at the lower terminal, Pleasant Plains, Prince's Bay, Dongan Hills and Grasmere.

**300
Factories**

Reports of the New York State Department of Labor indicate that there are 300 manufacturing establishments on Staten Island, which employed during the fiscal year of 1921 a maximum work-force of 15,950 persons. Of these 700 were office employees, 63 per cent being men and 37 per cent women. Of the remaining 15,250 employed in shops, 7 per cent were women and the rest men.



ONE OF THE PRINCIPAL PLANTS OF A NATIONALLY-KNOWN SOAP MANUFACTURING CONCERN, WHICH HAS RECOGNIZED THE INDUSTRIAL ADVANTAGES OF STATEN ISLAND. EXTENSIVE AREAS IN THE IMMEDIATE VICINITY ARE AVAILABLE FOR INDUSTRIAL DEVELOPMENT.

Many of the plants included in the total of 300 are so-called "neighborhood industries," such as bakeries and laundries. There are, for instance, 34 automobile repair shops employing 121 persons; 23 laundries with a total force of 48 persons; and 19 shoe repairing establishments having 28 employees. If such industries are eliminated, together with others having a working force of less than five persons, there remain 120 concerns, which may be classified as follows:

Industrial Establishments on Staten Island Employing Five or More Persons Per Plant

<i>Industries</i>	<i>No. of Plants</i>	<i>No. of Employees—</i>		
		<i>Office</i>	<i>Shop</i>	<i>Total</i>
1. Building Materials	10	32	898	930
2. Chemicals, Colors and Dyes.....	7	11	441	452
3. Fireworks	3	3	266	269
4. Foods, Beverages, etc.	11	27	764	791
5. Ice	3	2	41	43
6. Metals and Metal Products.....	8	79	568	647
7. Paints, Oils and Varnishes.....	3	24	240	264
8. Paper, Paper Products and Printing	7	30	363	393
9. Public Utilities	6	11	614	625
10. Shipbuilding and Repairing.....	18	280	6,526	6,806
11. Textiles and Allied Products.....	27	5	839	844
12. Miscellaneous	17	185	3,279	3,464
	120	689	14,839	15,528

From the table it is evident that the most important industry on Staten Island is shipbuilding. **Shipbuilding**
Leads

There are eighteen shipyards and repair plants. Some conception of the size of the industry is indicated by the fact that during the calendar year of 1920 four of these plants turned out 39 freight steamers, 3 tankers, 3 refrigerator ships, 2 freight and passenger vessels, 10 mine sweepers, 6 sea-going tugs, 2 wooden tugs, 4 one-thousand-ton coal barges and two floating sectional dry docks, in addition to a number of scows, lighters and so forth. Besides the plants primarily used to construct new tonnage there are numerous concerns devoted exclusively to ship repairing.

In point of numbers the largest group of plants on Staten Island is engaged in the manufacture of textiles and allied products. There are 27 such plants employing five or more workers. The average number of workers for these plants is thirty-one.

**Docks and
Warehouses**

In addition to the manufacturing concerns proper, there are also dock and warehouse facilities which are of industrial importance. The most extensive piers now in operation are those of the Baltimore and Ohio Railroad Company at St. George, the American Dock Company at Tompkinsville and Pouch Terminal at Clifton; and it is expected that the City's new piers will be entirely completed within a few months.

**Industries
Concentrated**

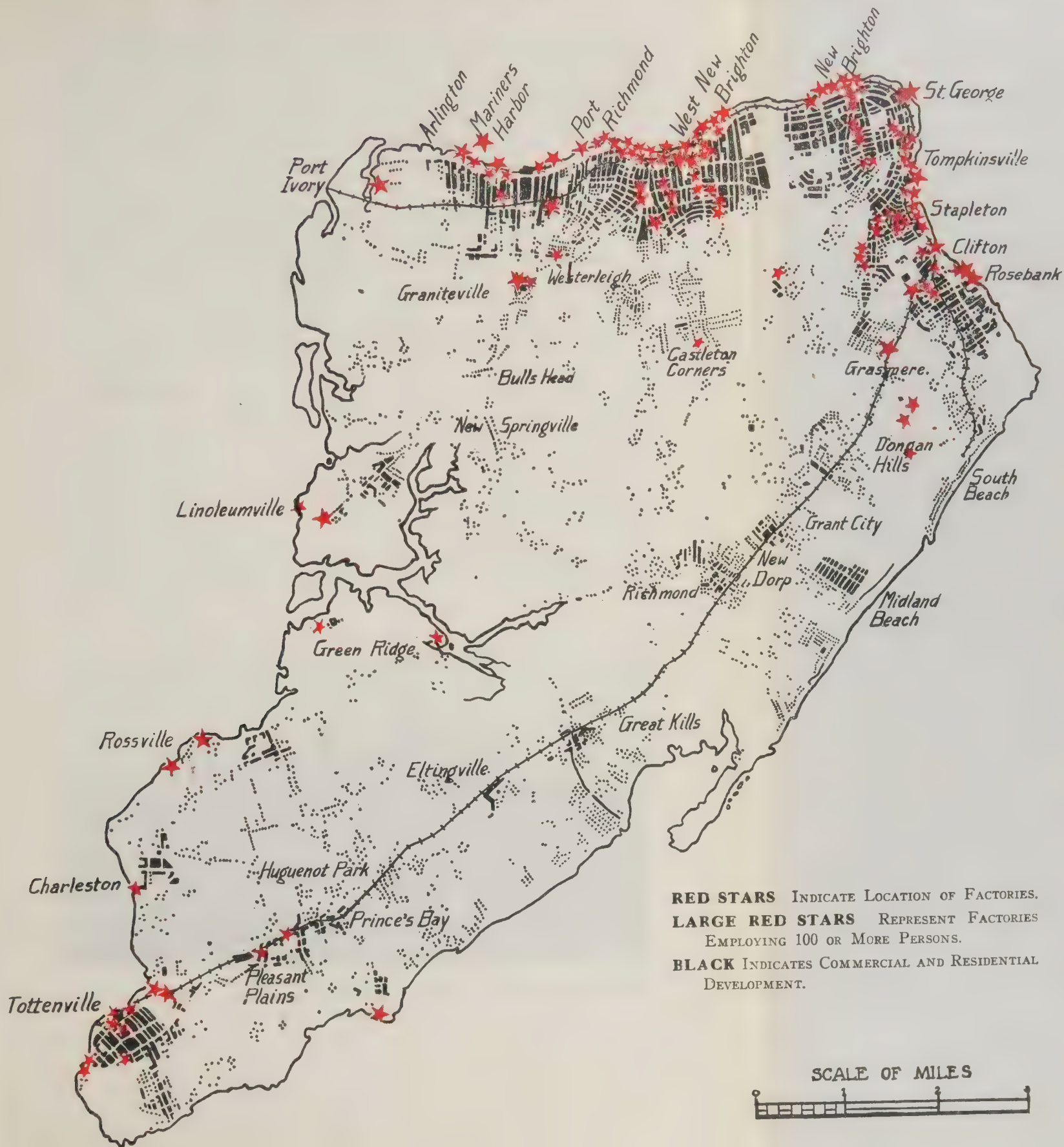
The industries on Staten Island are largely concentrated along the shores facing New York City within the two-mile belt, which, likewise, includes the majority of the Island's population. Out of 120 of the larger manufacturing plants located on the Island, 94, or 78 per cent, are included within this belt. For many years this section has been steadily growing in industrial importance, due to its proximity to the rest of the City and also to its excellent combination of rail and water transportation facilities. Of the 62 manufacturing concerns located along the north shore, the largest are the Staten Island Shipbuilding Co., The Standard Shipbuilding Corp., The Procter & Gamble Mfg. Co., Barrett Nephews & Co., Standard Varnish Works, National Lead Co., J. B. King & Co., W. P. Tanner-Gross & Co., C. W. Hunt Co., and Verdon & Co., Inc. The majority of the plants along this shore are centered in the towns of New Brighton, West New Brighton, Port Richmond and Mariners Harbor. At Arlington there is an up-to-date coal-dumping plant operated by the Baltimore and Ohio Railroad Company, by which coal is dumped from cars directly into barges, scows and other vessels. During 1920 over 1,600,000 tons of coal were dumped at this pier.

**East Shore
Commercial**

From a strictly industrial standpoint the east shore is not as highly developed as the north. The largest plants along this shore are the New York Harbor Dry Dock Co., Edgewater Saw Mills Co., Louis Dejonge & Co., L. A. Dreyfus Co., G. Siegle Corp. of America, Rubsam & Horrman Brewing Co., and the repair shops of the Staten Island Rapid Transit Railway Co.

From the standpoint of commerce, however, this shore is by far the most important section of the Island. Four large steamship piers of the American Dock Company are located at Tompkinsville and three new modern piers of the Pouch Terminal are located at Clifton. Between these two terminals lie an old city pier

MAP III—STATEN ISLAND'S PRESENT DEVELOPMENT.



at Stapleton and the 12 new municipal piers now nearly completed. Back of the piers of the American Dock Company and Pouch Terminal are modern warehouses, which are among the finest in the Port, and it is planned to erect warehouses behind the City's piers. When this development has been completed this shore will have one of the most extensive steamship pier developments in the world.

The tracks of the Baltimore and Ohio Railroad skirt this shore from end to end, and afford direct all-rail connections between the piers and trunk lines on the mainland. Obviously, this section of Staten Island has remarkable industrial and commercial advantages.

**Some
Scattered
Industries**

South of the two-mile belt extending along the north and east shores there are 26 factories. Of these nine are located at Tottenville, three at Graniteville, two each at Green Ridge and Grasmere, Pleasant Plains, Rossville, Linoleumville and Dongan Hills, and one each at Prince's Bay and Charleston. Of these the largest are the S. S. White Dental Manufacturing Company at Prince's Bay, the Tottenville Copper Company and the Atlantic Terra Cotta Company at Tottenville, the Unexcelled Manufacturing Company, Inc., at Graniteville, the American Linoleum Company at Linoleumville, the Oakland Chemical Company of Rossville, and the brick yards of the American Brick Company on the west shore.



THIS LARGE PLANT, LOCATED ON THE SOUTH SHORE, UTILIZES DEEP WATER FACILITIES.



STATEN ISLAND'S NORTH SHORE STILL OFFERS DESIRABLE UNDEVELOPED SITES
WITH BOTH RAIL AND DEEP WATER FACILITIES.



THIS PLANT BENEFITS FROM THE UNUSUAL TRANSPORTATION ADVANTAGES
OF THE NORTH SHORE.

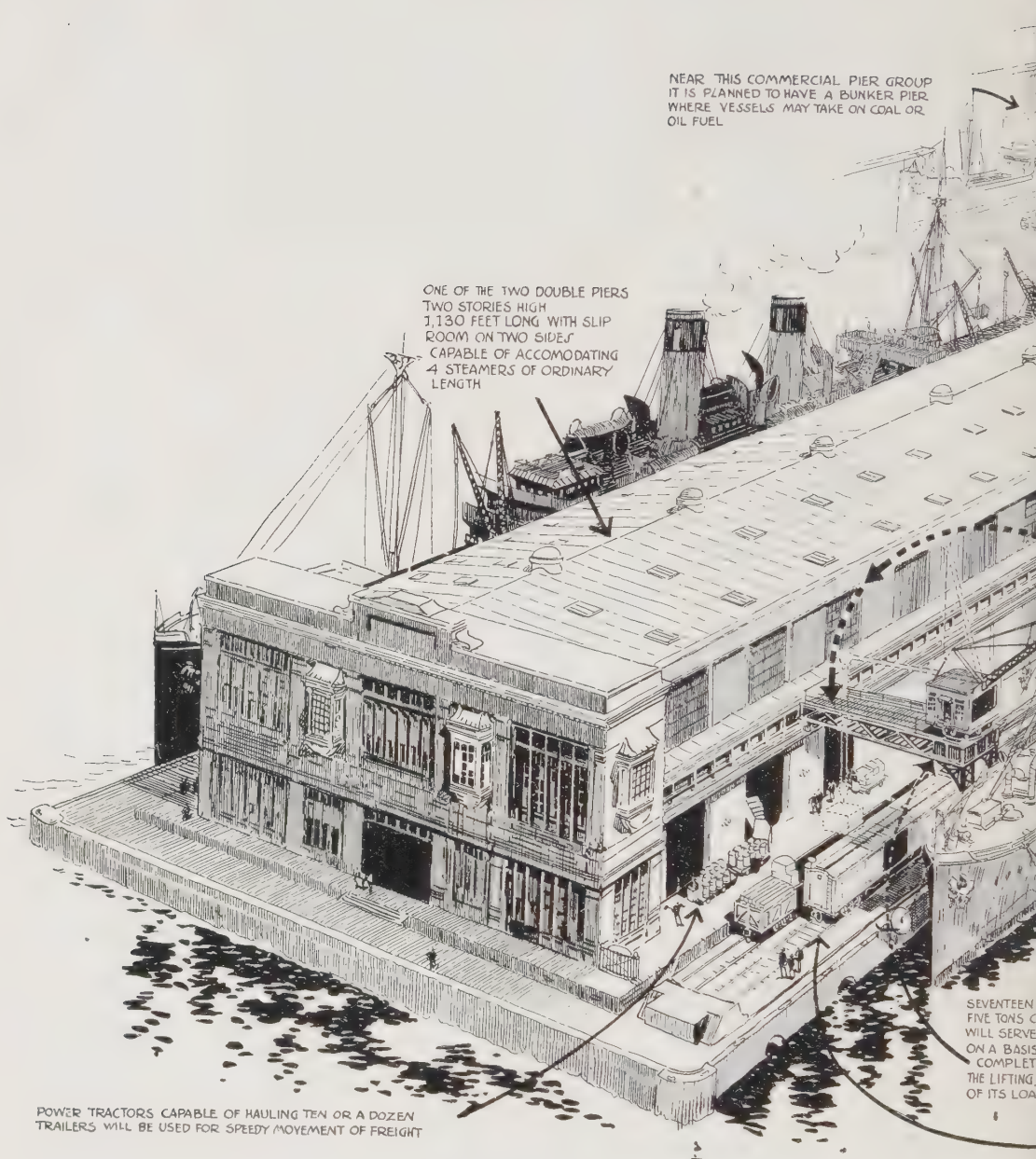
CHAPTER IV

AVAILABLE BUILDING SITES

Staten Island has extensive tracts of undeveloped land suitable for industrial development. Numerous sites can be secured with either rail or water facilities and some combining both. The size of the sites varies from a few hundred square feet to several hundred acres, larger acreage being available here than in almost any other section of the City. Prices range from \$500 to \$5,000 an acre, except for a few exceptional sites. On the whole prices for Staten Island sites are very much less than for similar sites in other sections of New York City or vicinity.

Building Regulations	The lands suitable for industrial development lie primarily along the shore lines of the Island and along the railroad lines. On the basis of a careful survey of the Island by the City Planning Commission of New York, the City set aside these sections for industrial uses. This was done under authority of the Building Zone Resolution of 1916, which provides for the zoning of the City in accordance with four classifications. These classifications, or "use districts" as they are called, are as follows: (1) residence, (2) business, (3) unrestricted, and (4) undetermined.
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Residence and Business Districts	In a residence district office buildings and manufacturing establishments of all kinds are excluded; only dwellings, private clubs, hotels and apartments are permitted. In a business district residences and office buildings are permitted, but industrial establishments are either excluded entirely or limited as to the per cent of floor space they may occupy. In these districts many industries, such as boiler making, fat rendering, smelting and the like, are specifically excluded. In such districts practically no building may be used for factory purposes in excess of 25 per cent of its total floor space, except that an area equal to the ground floor may be so used. This provision was incorporated in the law because of the factory facilities required by certain retail trades and such establishments as shoe-repairing concerns, tailoring shops and laundries, which are necessary for the convenience of a neighborhood and which, if limited in size, are not objectionable.
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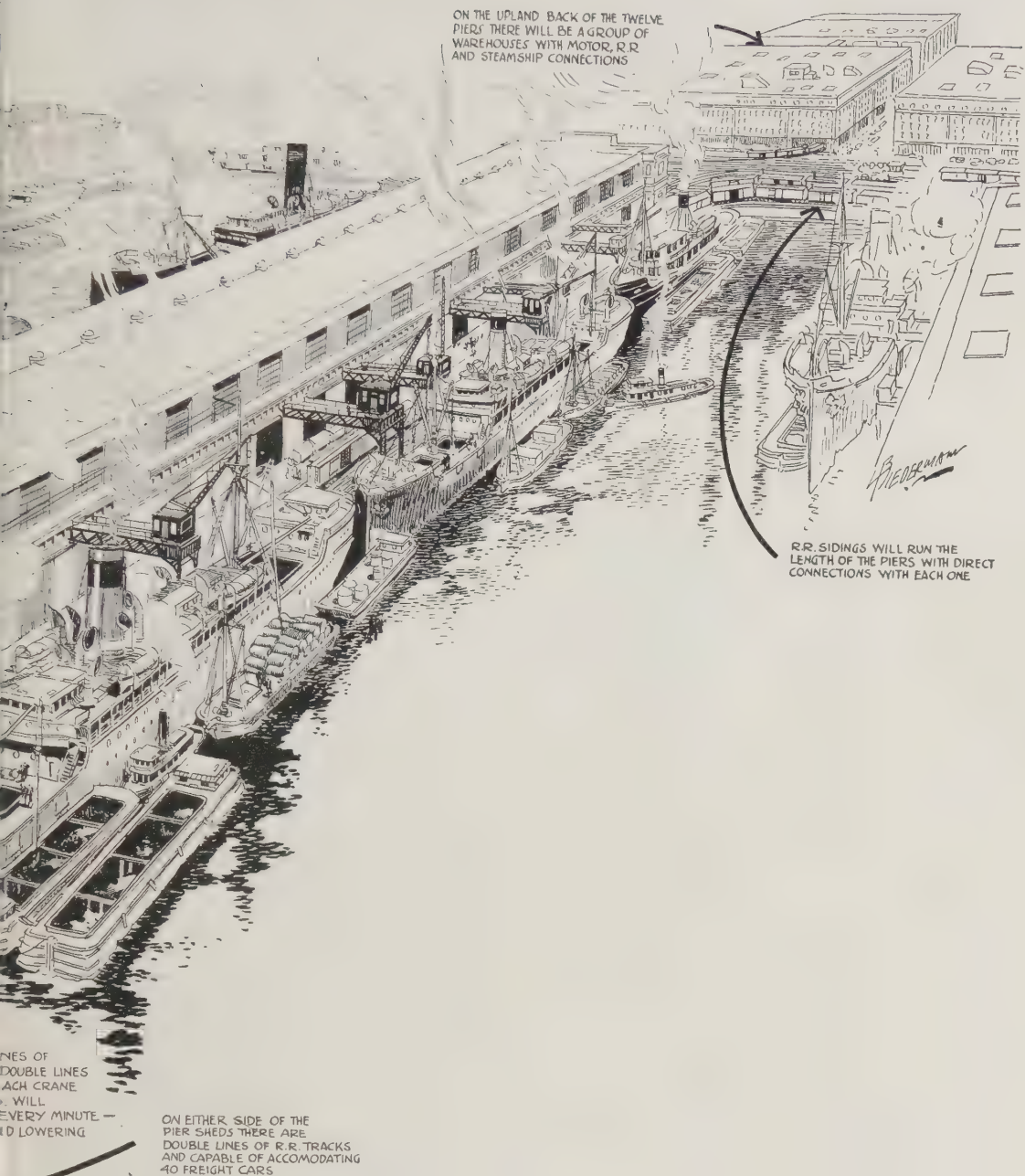
NEAR THIS COMMERCIAL PIER GROUP
IT IS PLANNED TO HAVE A BUNKER PIER
WHERE VESSELS MAY TAKE ON COAL OR
OIL FUEL

ONE OF THE TWO DOUBLE PIERS
TWO STORIES HIGH
1,130 FEET LONG WITH SLIP
ROOM ON TWO SIDES
CAPABLE OF ACCOMODATING
4 STEAMERS OF ORDINARY
LENGTH

POWER TRACTORS CAPABLE OF HAULING TEN OR A DOZEN
TRAILERS WILL BE USED FOR SPEEDY MOVEMENT OF FREIGHT

SEVENTEEN GANTRY
FIVE TONS CAPACITY
WILL SERVE THIS
ON A BASIS OF 1
COMPLETE A
THE LIFTING, SWING
OF ITS LOAD

(Courtesy of the N. Y. World)



ONE OF THE ENORMOUS DOUBLE-DECKER PIERS RECENTLY CONSTRUCTED BY
THE CITY OF NEW YORK AT STAPLETON, S. I.

Unrestricted and Undetermined Districts

The terms “unrestricted” and “undetermined” are used to designate zones which at the present time are entirely unlimited as to use. It is assumed by the City authorities that the development in unrestricted districts will be largely industrial. In the case of undetermined sections, however, it is felt that the most appropriate use cannot be fixed until New York’s port and terminal facilities have been more fully developed. Meanwhile, they are open to industrial development.

The various zones as at present determined are shown on the accompanying map. As indicated, extensive sections are unrestricted

MAP IV—BUILDING DISTRICTS ON STATEN ISLAND.



New York City’s Zoning Regulations Have Set Aside Wide Areas on Staten Island for Industrial Uses

and available for industrial purposes. A wide belt along the entire western coast of the Island and narrow fringes along the northern and eastern shores are unrestricted. Certain inland sections around Stapleton and Clifton are also unrestricted as well as a half dozen areas along the southern shore following the railroad. In addition to the unrestricted areas, there are three large undetermined sections extending along the southern end of Staten Island. Considerable areas in the northern end and two relatively small districts at the southern part of the Borough are limited entirely to residential uses. The remaining sections of the Island have been designated as business districts, which means that most industries are excluded from them.

Modifications Possible The zoning regulations apply only to buildings constructed after the enactment of the Zoning Law in 1916, and do not affect any structures erected prior to that date. Moreover, it is possible to modify the zoning laws, provided the Board of Estimate and Apportionment adopts a special resolution to that effect. Since the law was originally enacted numerous changes of this kind have been adopted.

In an area as undeveloped as Staten Island it is not possible to prophesy accurately concerning the future development. An analysis of the natural advantages of the Island indicates, however, that the City's zones are, for the most part, wisely drawn.

Sites Along North Shore On the whole the most valuable industrial sites on Staten Island are located along the northern shore. Here are numerous waterfront properties on deep water within New York's free light-erage limits. The channel along the entire shore is 25 feet deep and through Kill van Kull it is being deepened to 30 feet. Many of the sites also have railroad transportation facilities. With deep water on one side and mainland railroad facilities on the other these sites within the free lighterage limits of the Port offer great transportation advantages.

The north shore falls naturally into two sections which differ considerably in industrial advantages. The eastern half, between St. George and Port Richmond, has an abrupt shore line. In many places the land rises rapidly a few feet back from the water line. The railroad tracks follow the water's edge along this entire district. Parallel with the railroad, but on the high ground above, is Richmond Terrace, an important and much-used highway. This

road and the precipitous shore line make it impossible to secure large waterfront areas, but there are many small tracts available for intensive development. With the exception of a few hundred yards of waterfront at each end of this section, the pierhead and bulkhead lines are coincident and follow the shore line closely.

**Rail and
Water
Facilities**

Although this section does not offer opportunity for piers of steamship size it does afford narrow strips of frontage on deep water with railroad transportation facilities, a combination of advantages which is constantly and rapidly diminishing within the Metropolitan District.

Available lots along this eastern half of the north shore are fairly numerous. They usually extend from the bulkhead line to the railroad. Most of the sites, however, are almost entirely under water. They can be secured with as small a frontage as 50 feet, and from that up to 800 feet. On a front foot

Prices

basis the land varies from about \$350 to \$600 a foot. Prices per square foot would range from about 75c to \$2.50 or more, although no quotations for waterfront property on Staten Island are actually made on a square foot basis.

There are a few undeveloped properties in this section, particularly in West New Brighton, with railroad, but not with waterfront, facilities. These properties average three and four acres in size and sell for about 25c per square foot and upwards.

The western half of the north shore is quite different from the eastern. At Port Richmond the railroad tracks leave the water's edge and as they proceed westward draw further and further away from the shore line until, at Port Ivory Station, they are about three-quarters of a mile from Newark Bay. This does not mean, however, that concerns located along the shore front in this section do not have railroad facilities. Several plants situated on the water's edge have secured sidings from the main line of the railroad into their plants.

The coast line itself along this half of the shore is far less precipitous than at New Brighton. In fact, around Holland Hook and Port Ivory the shore for a considerable distance back from the water is level and in some places marshy. The pierhead and bulkhead lines in this section are sometimes coincident, but generally offer opportunity for piers from 300 to 600 feet in length.

This part of the shore includes a few waterfront properties with extensive upland and direct rail facilities. There are also

numerous waterfront properties without rail service, as well as properties along the railroad tracks which do not have waterfront advantages.

**A Remarkable
Tract**

The largest available tract with both rail and water facilities within this district is a site having a 400-foot front on the western end of Kill van Kull, besides 10 acres of adjoining upland which is traversed by the Baltimore and Ohio Railroad. The waterfront of this property is valued at about \$500 per front foot and the 10 acres of upland at \$5,000 per acre.

Scattered along this section, from Port Richmond to Holland Hook, there are various sites along the water's edge suitable for industrial purposes. These are without direct rail connections. In certain places along this shore it is possible to purchase a thousand feet of undeveloped waterfront. Prices vary from \$300 to \$500 per front foot, which means approximately 50c to \$1.00 per square foot. This waterfront property lies next to uplands where plots of perhaps 50 acres could be secured.

Along the railroad tracks within this district there are available industrial sites, especially at Port Richmond and Mariners Harbor, which have no water frontage. One of the largest of these plots covers 35 acres with a frontage of more than 400 feet along the railroad. There are other plots as small as one acre. The prices range from 15c to 40c per square foot.

**Available
Plots,
East Shore**

The east shore has both rail and water transportation facilities. The tracks of the Baltimore and Ohio follow the shore line a few hundred feet from the water's edge. The shore front faces the Narrows, which has a deep, navigable channel. The pierhead line extends out from the shore about 1,800 feet and the bulkhead line 1,000 feet, thus allowing very extensive pier developments.

From the standpoint of commerce the eastern shore affords remarkable facilities. The deep channel, enormous piers and direct all-rail transportation facilities afford an unusual combination even for New York City. The development of this section is limited in extent somewhat by the hills which parallel the shore. Since they are nearly a mile from the water's edge, however, they leave a considerable area for industrial and commercial uses.



THIS TYPE OF LAND IS AVAILABLE IN ENORMOUS TRACTS ALONG THE WEST SHORE

**Size and
Price**

Within recent years most of the available manufacturing sites along the east shore have been bought by business and industrial interests.

There are still a few waterfront properties, however, beyond the present free lighterage limits between Clifton and Fort Wadsworth. The frontage of these plots varies from 100 to 550 feet, but more might be assembled if desired. Prices range from \$400 to \$600 per front foot or, roughly, 20c to 80c per square foot. Along the railroad tracks there are no undeveloped building sites, except south of Clifton, where there are a few small plots available for industrial development. This land is valued at approximately 25c per square foot.

**Undeveloped
Land,
West Shore**

By far the most extensive areas on Staten Island which are appropriate and available for industrial uses are located along the west shore. Up to the present time the industrial development along this shore has been surprisingly slight.

Along the eleven miles of waterfront on Arthur Kill, between Holland Hook on the north and Tottenville on the south, there are only seven factories. The chief difficulties have been that this section has lacked adequate labor and rail transportation facilities. Except at the most northerly and southerly ends, the shore is without railroad service and a labor supply has not yet been developed. Even trolley facilities are lacking. The average density of population along this section is only one person per acre. Much of the land along the waterfront is low and marshy. This, however, permits the construction of slips inshore from the bulkhead lines, thus offering very desirable shipping facilities. At some points long



AIRPLANE VIEW OF ARTHUR KILL SHOWING THE LARGE INDUSTRIAL PLANTS
ALONG THE JERSEY COAST WHICH INDICATE THE DEVELOPMENT THAT MAY
BE EXPECTED ON STATEN ISLAND.

(Anchored vessels are the property of the U. S. Shipping Board)

piers may also be constructed out from the shore. Arthur Kill has a 25-foot navigable channel throughout its entire length.

**Enormous
Potential
Value**

The potentialities of the west shore are strikingly realized when one glances across the Arthur Kill to the New Jersey shore. Here great industrial plants occupy nearly every foot of shore. Yet this is the development of only a few years. The Staten Island shore is similar in character and a few improvements, especially railroad facilities, would unquestionably guarantee it a similarly remarkable growth.

**Land
Values
Low**

Even at the present time the west coast affords suitable sites for industrial plants demanding extensive areas of land with tidewater facilities. Concerns transporting heavy foreign tonnage might very advantageously locate on this shore. Here sites can be secured of almost any size, running, in fact, into hundreds of acres. Moreover, there is little doubt that the Baltimore and Ohio Railroad would furnish a spur to any large concern located within a reasonable distance of its present lines. Water-front sites along this shore can be purchased for as little as \$1,000 an acre and the maximum price does not exceed \$3,500 per acre.

**South Shore
Sites**

The future development of the south shore, at least during the next decade or so, is uncertain. At the present time there is only one plant on the waterfront and about half a dozen along the railroad which parallels the shore. This district has always been used principally for residential purposes. The coast is dotted with houses and bungalows. Extensive areas are used as bathing beaches and amusement parks. The whole section is so desirable from a residential point of view that some real estate experts believe it will never develop to any extent industrially. Others, however, are confident that it is destined for a remarkable industrial and commercial expansion. They point to the fact that this coast is appreciably nearer in traveling time to the foreign ports of the world than almost any other section of Greater New York, that the shore line is such that piers of enormous size can be constructed to receive large vessels and that the water intervening between Staten Island and New Jersey is so narrow that railroad connections can easily be constructed from such piers to trunk lines on the mainland.

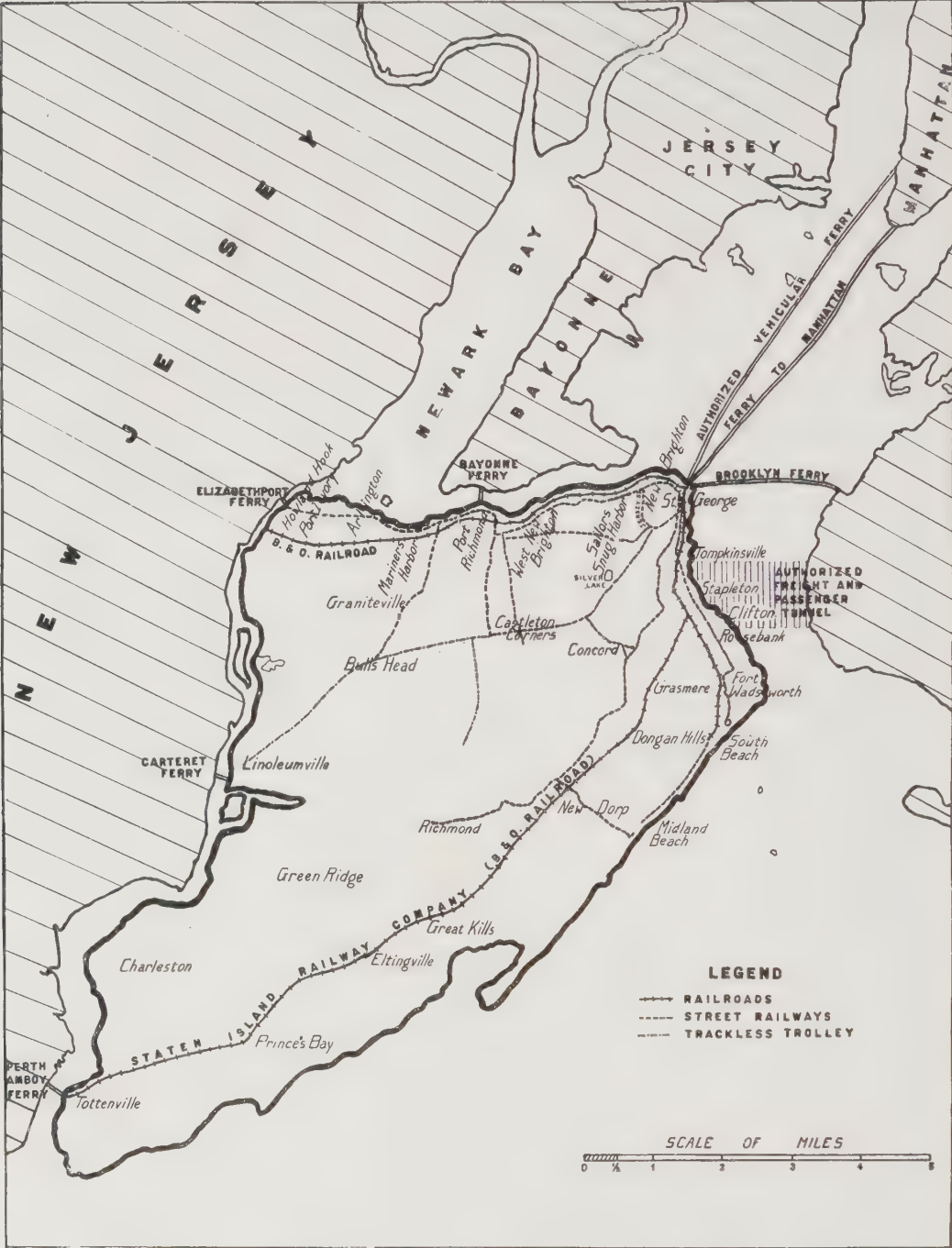
Both of these opinions are probably partially correct. During the next few years it is not likely that there will be extensive indus-

trial or commercial expansion along this coast. Probably it will continue to develop as a residential section. Ultimately, however, the south shore is almost sure to see industrial and commercial developments of considerable magnitude. No shore front within the Metropolitan District which offers industrial or commercial advantages has been able to withstand the encroachment of industries seeking waterfront locations. Other waterfront properties within New York City are becoming increasingly scarce and manufacturers will, in the future, turn more and more to Staten Island for suitable industrial sites. If New York City continues to expand at the same rate during the next 20 years as in the past the development of Staten Island's south shore will probably occur within the present generation.

Such development, however, is dependent upon
Improvements extensive improvements. The water along the
Needed coast is very shallow, so that dredging of ship
channels is a first essential. The coast faces
directly upon the Atlantic Ocean and thus has little protection from
sea and wind. A breakwater, therefore, is necessary to protect
shipping. Following such improvements this coast would probably
be brought within the free lighterage limits of the Port and would
be further developed by the construction of piers, warehouses and
rail facilities. This section would offer phenomenal advantages.
The shore line, back from the coast for more than a mile, is unusu-
ally level; thus it would be possible to have piers along the water-
front with warehouses adjoining, and industries in back of them.
Land is available in large quantities, so that industries of consider-
able size, such as steel plants, lumber yards, etc., might secure suf-
ficient acreage to locate here.

Pending such improvements the industrial development of the
south shore will probably be confined primarily to sections along
the railroad tracks between Clifton and Tottenville. Numerous areas
along this section have been set aside for industrial uses by the
City Planning Commission and they afford direct rail connections
with the mainland. Average prices for land range between \$1,000
and \$3,000 an acre.

MAP V—PASSENGER TRANSPORTATION FACILITIES OF STATEN ISLAND.



(As the Report Goes to Press, Announcement Is Made That a New Trackless Trolley from Richmond to Tottenville Will Soon Be in Operation.)

CHAPTER V

LABOR SUPPLY

Staten Island draws its labor supply from its own population of 116,531 and from the vast population areas which surround it in New York and New Jersey. This surrounding population is tapped by six ferry systems, which carried, in 1920, more than 26,000,000 persons. The present ferry service will soon be augmented by a new system to be operated between Cortlandt Street, Manhattan, and St. George, Staten Island. More important is the authorized tunnel between Staten Island and Brooklyn, referred to above. According to the law authorizing this project construction must be started before May, 1923. This line, when complete, will give Staten Island direct subway service not only to Brooklyn, but to Manhattan as well, will facilitate the movement of workmen from these boroughs to Staten Island and, by establishing better connections between Staten Island and the rest of New York, induce more workmen to live on the Island.

Population **116,500**

Considering that Staten Island comprises nearly a fifth of the land area of New York City, its population of 116,531 is not large. The average density is only 3.2 persons per acre. This compares with an average of 6 in the Borough of Queens, 34 in the Bronx, 39 in Brooklyn and 163 in Manhattan.

Like the industries, the population of Staten Island is concentrated along the shores facing Manhattan and Brooklyn. The two-mile zone extending back from the north and east shores, which includes 78 per cent of the factories of the Island, takes in 67 per cent of the population. In this belt the average density per acre is 13 persons. Throughout the rest of the Island the density is only 1.2 persons to the acre.

Foreign **Nationalities**

The most important groups of foreign-born whites on Staten Island are the Italians, Germans, Irish and Poles. The groups next in importance are the English, Russians, Norwegians, Swedes, Austrians, Hungarians, Canadians and Scotch. There are a dozen other nationalities sparingly represented. In all the foreign-born whites comprise 27 per cent of the total population. There are also 1,500 negroes.

Recent Growth

During recent years Staten Island has been growing far more rapidly than New York City as a whole. Between 1910 and 1920 the population increased 35.6 per cent. This compares with an increase during the same period for Greater New York of 17.9 per cent. In other words, during the last ten years Staten Island has grown twice as rapidly as the City as a whole. This growth was due, in part, to the war, which caused the expansion of Staten Island's shipbuilding industry and attracted large numbers of additional workers to the Island. Many of these people have now made Staten Island their permanent home.

In the future the population of the Borough will probably increase even more rapidly. The vast new municipal piers and the proposed improvements in the rapid transit facilities, both on Staten Island and between the Island and the other sections of the City, are factors that will accelerate its growth.



STATEN ISLAND AFFORDS ALL TYPES OF HOMES.

Housing Housing accommodations on Staten Island consist of about 17,500 one-family dwellings, 2,500 two-family dwellings, 550 tenements without elevators and 65 elevator apartments, including hotels. The proportion of one-family dwellings is far larger than in any other Borough of New York. For the City as a whole only 48 per cent of all residential buildings are single-family dwellings, whereas in Richmond the percentage is eighty-seven.

The types of houses vary from summer cottages to extensive estates. There are numerous small frame structures suitable for workingmen's homes. The Island has been settled since Colonial times and there are many old established communities having roads, schools, libraries, churches and civic organizations, which are factors of great importance to the laboring man.

Transportation The population of Staten Island can be readily mobilized for industrial service. For interior communication Richmond Borough has twenty-three and one-half miles of double track steam railway, which is used for passenger as well as freight transportation, and thirty-six miles of trolley road, of which twenty-nine are double tracked. The steam roads on Staten Island are operated by the Baltimore & Ohio Railroad Company and its subsidiary, the Staten Island Rapid Transit Railway Company. One branch of the railroad skirts the north shore between Port Ivory and St. George.

Railroads This line passes through the industrial districts of New Brighton, Port Richmond, West New Brighton, Mariners Harbor, etc. The service consists of sixty-five trains daily each way. The time required for each trip is approximately twenty minutes.

Along the east shore, between St. George and South Beach, there is another line operating sixty trains a day. The time per trip is little more than fifteen minutes. A third line runs the entire length of the Island between Tottenville at the southern end and St. George at the north. This road has thirty-four passenger trains daily.

During the year ended December 31, 1920, the railroad lines of Staten Island hauled 13,000,000 passengers, of whom 8,000,000 were carried on the north and east shores and 5,000,000 on the south shore. Passenger fares on the north and east shore lines are eight cents per passenger, while on the main line from St. George to

Tottenville they are based upon a charge of three cents per mile, with low commutation, family and school fares.

Trolleys The thirty-six miles of trolley lines on Staten Island traverse the northern portion of the Island and are managed in part by the Richmond Light and Railroad Company and in part by the City of New York. Each operates five lines. Those run by the Richmond Light and Railroad Company are:

<i>Lines</i>	<i>Distance (Miles)</i>	<i>Running Time (Minutes)</i>
1. St. George to South Beach.....	4.5	25
2. St. George to Elizabethport Ferry.....	7.6	45
3. St. George to Jersey Street.....	2.1	13
4. Port Richmond to Bulls Head.....	3.0	20
5. South Beach to Midland Beach.....	1.5	10

The Municipal lines are:

<i>Lines</i>	<i>Distance (Miles)</i>	<i>Running Time (Minutes)</i>
1. St. George to Richmond.....	7.9	52
2. St. George to Midland Beach.....	7.4	45
3. St. George to Port Richmond..... (via Silver Lake)	6.1	40
4. St. George to Port Richmond..... (via Concord)	7.7	45
5. West New Brighton to $\frac{1}{4}$ mile South Castleton Corners (via Manor Road)	2.5	20

Trackless Trolleys In addition to regular trolley lines the City is now experimenting with trackless trolleys. Two such lines are already in operation, which connect Seaview Hospital and Linoleumville with the City's regular trolley system.*

Municipal Ferries Seven of the largest ferry boats in the world are operated by the City of New York between St. George, Staten Island, and the Battery, Manhattan. Each vessel has a capacity of 2,500 passengers, in addition to space for carrying twenty-four automobiles. During 1920 this system carried more than 20,000,000 passengers and nearly 600,000 vehicles.

The time per trip is twenty-three minutes, the fare per passenger five cents and the charge for vehicles from 30c to \$1.00.

*As the report goes to press announcement is made that a new trackless trolley from Richmond to Tottenville, a distance of nine miles, will soon be in operation.

Other Ferries A second ferry system, operated between St. George and Sixty-ninth Street, Brooklyn, makes it possible for concerns in Richmond, particularly those in the northeastern part of the Island, to draw upon a part of Brooklyn's enormous labor supply: Ferry rates are sixty cents for automobiles, seventy cents for trucks and five cents for passengers. The running time is fifteen minutes. Another ferry is operated between Port Richmond, S. I., and Bergen Point, Bayonne. The rates are six cents for passengers and twenty-one cents and upwards for vehicles. The time per trip is five minutes. At the northwestern corner of the Island there is a ferry between Howland Hook, S. I., and Elizabethport, N. J. The time per trip is five minutes, the rate for passengers five cents and the maximum rate for vehicles forty cents. There is a ferry in operation between Tottenville, S. I., and Perth Amboy, N. J. The trip requires six minutes. Passenger fares are six cents. The rate for automobiles and horse-drawn vehicles varies from thirty cents to seventy-eight cents. Ferries also operate part of the year between Linoleumville, S. I., and Carteret, N. J.

**Newly
Authorized
Ferry**

The new vehicular ferry system recently authorized by the Board of Estimate and Apportionment of New York City to operate between Cortlandt Street, Manhattan, and St. George, S. I., will accommodate passengers as well as vehicles.

The boats will be the fastest ferries in the world.



THE LARGEST FERRY BOATS IN THE WORLD OPERATE BETWEEN MANHATTAN AND STATEN ISLAND.



AIRPLANE VIEW SHOWING THE B. & O. FREIGHT YARD AT ST. GEORGE, S. I.,
AND THE VAST PIER DEVELOPMENT ALONG THE NARROWS

CHAPTER VI

FREIGHT TRANSPORTATION FACILITIES

Transportation Manufacturers on Staten Island can readily ship or receive goods to or from any part of the world.

Facilities The numerous piers and warehouses along the east shore make it possible to import raw materials at low cost and to ship finished products readily to any foreign market. The twenty-three and one-half miles of double track railroad which skirt the north, eastern and southern shores furnish direct rail transportation to points inland. The north and east shores lie, for the most part, within the free lighterage limits of New York. The Island's extensive ferry service enables manufacturers to send their products by motor truck to all parts of the New York Metropolitan District, the world's greatest consumers' market.

Excellent



THE ST. GEORGE FREIGHT TERMINAL HAS A CAPACITY OF 1,000 CARS AND HANDLES LIGHTERED FREIGHT TO AND FROM ALL POINTS ON NEW YORK HARBOR.

**Enormous
New Docks**

The outstanding transportation development now under way on Staten Island is the City's \$20,000,000 pier project at Stapleton. This improvement, comprising twelve great piers, will provide five miles of wharfage for trans-Atlantic steamers—an amount sufficient to berth forty-eight good-sized vessels at one time—and the equipment and capacity of the piers will permit the handling of 14,000,000 tons of shipping annually, the equivalent of more than five thousand ships' cargoes of 2,500 net tons each. The piers are now about 95 per cent completed and one, which will be maintained as public wharfage, has already been opened.

**Construction
Modern**

The piers are of three types. Eight are to be 125 feet wide and covered by single-story, steel freight sheds with railroad tracks down the center of the pier. Two will be 130 feet in width and covered by two-story steel freight sheds with railroad tracks down the center. The remaining two are to be 209 feet in width and will include platforms with railroad tracks along the sides, complete modern equipment of cranes, monorail cars and elevators for transferring motor trucks to the second deck. All of the piers will be over 1,000 feet in length, most of them will be over 1,100 feet, and the longest will be 1,184 feet.

Altogether, the piers cover 1,800,000 square feet, or approximately forty-four acres.

This improvement has been financed by nine lessees, each of whom has agreed to rent one or more of the eleven piers destined for private use and to pay an annual rental of $7\frac{1}{2}$ per cent of the total cost of acquiring the land and constructing the piers. The lessees are the Pan-American Terminal and Dock Corporation, Union Transport Co., E. M. Raphael & Co., Wessel, Duval & Co., Moore & McCormack, Nippon Yusen Kaisha, Compagnie Générale Transatlantique, International Mercantile Marine Co. and Green Star Steamship Co.

**Adjacent
Facilities**

Adjacent to the piers it is proposed to construct a number of modern warehouses and a comprehensive system of terminal facilities with tracks for storing the necessary freight cars to take care of the shipping upon each pier.

In addition to the new Municipal development, there are other up-to-date docks along the shore. The American Dock Company has four modern piers at Tompkinsville and the Pouch Terminal, Inc., has three at Clifton. Both of these concerns operate new fire-



proof warehouses in connection with their piers. These privately owned docks, together with the City's gigantic project, give this shore of Staten Island one of the most modern pier developments to be found anywhere in the world.

Railroads Staten Island's twenty-three and one-half miles of steam railroad are operated by the Baltimore and Ohio and its subsidiary, the Staten Island Rapid Transit Railway Company. In 1920 these lines handled about 4,000,000 tons of freight on Staten Island.

The rail equipment consists of a line crossing Arthur Kill by bridge at Port Ivory and following the shore line to the waterfront freight terminal at St. George. From St. George a line runs down the east shore a few hundred yards from the water's edge. At Clifton this road divides, one branch running past Fort Wadsworth to South Beach and the other extending the entire length of the Island along the south shore a mile or so back from the water's edge.

This marginal line, offering direct rail connections with the trunk lines to the south and west, gives Staten Island an obvious advantage over those sections of the City which are more largely dependent upon lighterage service for their freight transportation.

**Adequate
Freight
Terminals** Staten Island also has facilities for handling lightered freight to and from all points on New York Harbor through its freight terminal at St. George, which has a capacity of 1,000 cars.

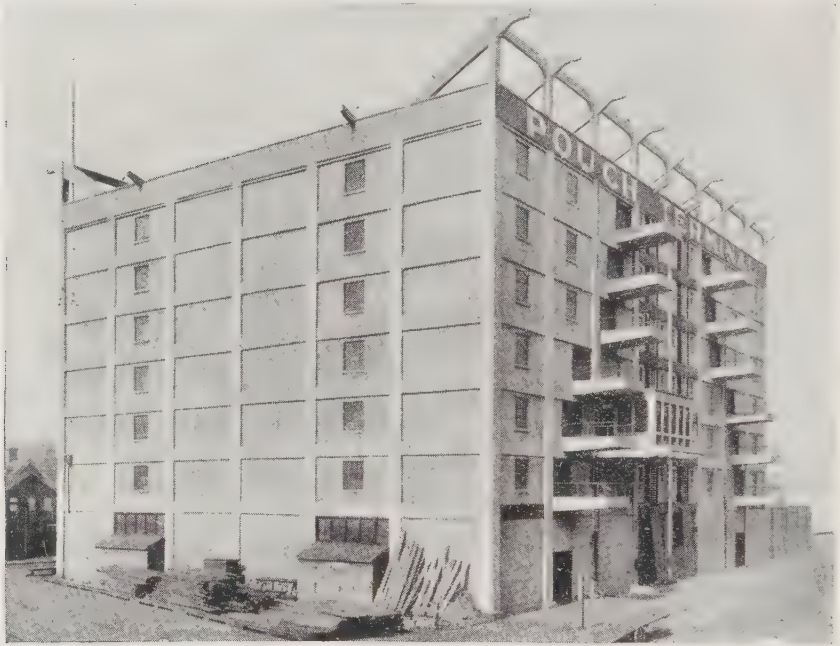
There is another large freight terminal known as the Arlington Yard, near Port Ivory, with a capacity of 3,000 cars. This capacity could easily be expanded if traffic should demand it.

**Freight
Rates** In the matter of freight rates Staten Island is on the New York rate basis and in substantially the same position as other points in Greater New York.

The waterfront from Clifton to Howland Hook is within the free lighterage limits, which means that all trunk lines serve this territory by lighter at the same rates as other territory within the free lighterage limits.

The rates to and from points in nearby territory reached by two or more lines are somewhat higher than the flat New York basis, but the interested lines have published many special rates to reduce this disadvantage. The local territory not reached from

Staten Island at equal rates varies on the different lines from fifty to one hundred miles from the Harbor. There have been many adjustments, however, equalizing specific rates even within this territory.



MODERN FIREPROOF WAREHOUSES ARE IN OPERATION AT CLIFTON, TOMPKINSVILLE AND ELSEWHERE ON THE ISLAND.

CHAPTER VII

MINOR INDUSTRIAL FACTORS

Water Supply

There are approximately 275 miles of water mains and 3,000 hydrants on Staten Island. Two-thirds of the water consumed is furnished by the Catskill water system, the \$200,000,000 project by which New York City is supplied with water brought by gravity from the watersheds of the Catskill Mountains. Staten Island's share of this water is conveyed to the Island by a 36-inch pipe, laid along the bed of the Harbor. It is pumped to a central distributing reservoir at Silver Lake, which is 228 feet above sea level and has a capacity of 440,000,000 gallons. The water not supplied by the Catskill system is pumped from wells located on the Island.

Since water rates are uniform throughout New York City, Staten Island consumers enjoy identical advantages with those in the other boroughs of the City. A number of concerns on the Island, however, pump their own water and thus effect a considerable saving in water costs.

Electricity

The power house of the Richmond Light and Railway Company, located at West New Brighton (Livingston), supplies all of the electric light and power for Staten Island and for the street railways of the Borough. This plant has a capacity of 22,800 kilowatts. Both direct and alternating currents are generated. A general rate available for all lighting and for power installations under two horsepower is ten cents per kilowatt, with a monthly minimum charge of one dollar. This rate compares very favorably with other sections of New York City similarly situated.

The rates for wholesale light and power service vary greatly, depending primarily upon the type of current used and the amount consumed. Although it is not possible here to give a table of rates that would cover the varying conditions of consumers, the Richmond Light and Railway Company will be glad to furnish detailed information and sample contracts on request. Their charges will be found to be reasonable.

Gas The gas supply of Staten Island is furnished by the New York and Richmond Gas Company which has 140 miles of gas mains. Although facilities in the northern section of the Borough are adequate to handle ordinary demands for gas, there are sections in the southern part of the Island which are now without gas. An extension of service may be made, however, as soon as the demand warrants it. The rates for gas on Staten Island are practically identical with those charged by other companies operating in districts of New York where industrial conditions are comparable.

Police and Fire Protection The police force of Staten Island has a total of 200 men. In addition there is a detective force of fifteen men. Traffic on Staten Island has recently increased to such an extent as to require the establishment of special traffic posts at various points on the Island. The hilly interior of the Island is patrolled by mounted police.

There are seventeen paid fire companies and ten volunteer organizations in Richmond Borough. The paid department employs about 300 men. A fire boat for the protection of piers, factories and warehouses along the waterfront has recently been assured, and with this equipment Staten Island will be as well protected against fire as any other part of the Port of New York.

Insurance With minor exceptions fire insurance rates throughout the Island are the same as for the rest of New York City. The insurance companies use the same rate tables for Richmond as for the other sections of New York. In establishing a rate the companies pay far more attention to the nature of the building, the type of industry and the particular location of the establishment than to the district or borough in which the plant is situated.

Taxes The tax rates on real estate in New York City include special assessments for different boroughs as well as taxes for City, County and State purposes. For this reason the tax rates in the five boroughs vary slightly. The 1921 tax rate on real estate in Richmond was \$2.83, as compared with an average of \$2.818 for the entire City. These rates apply to buildings as well as to the land on which they are located.

APPENDIX

Classified List of Concerns Located on Staten Island*

BUILDING MATERIALS

Allen-Wheeler Co.	Lumber and Mill Products 63 Broadway, West New Brighton.
American Brick Corp.	Brick Arthur Kill Road, Green Ridge.
Atlantic Terra Cotta Co.	Architectural Terra Cotta 5158 Arthur Kill Road, Tottenville.
Dolan Brick Co., Inc.	Brick 1163 Arthur Kill Road, Green Ridge.
Edgewater Saw Mills Co.	Lumber 367 Bay Street, Tompkinsville.
J. B. King & Co.	Plaster Paris, Plaster Board, Dry Mortar, Cement 576 Richmond Terrace, New Brighton.
Kreischer Brick Mfg. Co.	Brick Arthur Kill Road, Charleston (formerly Kreischerville).
J. A. Snyder & Bro.	Building Materials 3001 Richmond Terrace, Mariners Harbor.
Wm. S. Van Clief & Sons (three plants).....	Woodwork Port Richmond, West New Brighton and Pleasant Plains.

CHEMICALS, COLORS AND DYES

International Ultramarine Works	Ultramarine Blue Arthur Kill Road, Rossville.
Maple Chemical Co., Inc.	Fur Dyes 122 Maple Avenue, Rosebank.
Muralo Co.	Water Colors Richmond Terrace, New Brighton.
North American Chemical Engineering Co.	Chemicals Lake Avenue, Port Richmond.
Oakland Chemical Co.	Peroxide of Hydrogen 2807 Arthur Kill Road, Rossville.
G. Siegle Corp. of America	Dry Colors Rosebank.
Tanners Extract & Chemical Works	Tanning Extract 105 Union Avenue, Mariners Harbor.

FIREWORKS

Pain's Fireworks, Inc.	Fireworks Foot of Alter Avenue, Dongan Hills.
Unexcelled Mfg. Co., Inc. (two plants).....	Fireworks Graniteville and Dongan Hills.

FOODS, BEVERAGES AND KINDRED PRODUCTS

American Burtonizing Co.	Pomax 125 Lake Avenue, Mariners Harbor.
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* This list includes only concerns employing five or more persons.

American Linseed Co.	Linseed Oil and Cake
2385 Richmond Terrace, Port Richmond.	
Luigi, Calissano & Figli, Inc.	Bottlers
702 Van Duzer Street, Stapleton.	
Monroe Eckstein Brewing Co.	Brewers
Manor Road, West New Brighton.	
Globe Baking Co.	Bread
465 Bay Street, Stapleton.	
Goggi Bros.	Bottlers
754 Van Duzer Street, Stapleton.	
National Export & Commission Co.	Animal Oils
Bank Street, New Brighton.	
Notel & Stritt	Bakers
1107 Castleton Avenue, West New Brighton.	
Rubsam & Horrmann Brewing Co.	Brewers
163 Canal Street, Stapleton.	
Shults Bread Co.	Bread
Cary Avenue, West New Brighton.	
Adolph Somers	Chocolates
292 Van Duzer Street, Tompkinsville.	
W. P. Tanner-Gross & Co.	Flour Millers
Bank and Jersey Streets, New Brighton.	

ICE

North Shore Ice Company	Ice
101 Jewett Avenue, Port Richmond.	
Richmond Ice Company	Ice
Edgewater Street, Rosebank.	
S. I. Hygeia Ice & Cold Storage Co.	Ice
23 Gordon Street, Stapleton.	

METALS AND METAL PRODUCTS

Carlson & Son	Oil and Gasoline Engines
2319 Richmond Terrace, Port Richmond.	
Charles D. Durkee & Co.	Marine Hardware
Clove Avenue, Grasmere.	
Errington Mechanical Laboratory	Tools and Special Appliances
24 Norwood Avenue, Stapleton.	
J. D. Hart	Coppersmith
Foot North Burgher Avenue, West New Brighton.	
C. W. Hunt Co.	Conveying Machinery
1580 Richmond Terrace, West New Brighton.	
Tottenville Copper Co.	Copper Ingots and Bars
Bedell Avenue, Tottenville.	
West Brighton Brass & Iron Foundry, Inc.	Brass Castings
134 North Burgher Avenue, West New Brighton.	
Wood & Selick, Inc.	Bakers' Supplies
94 State Street, West New Brighton.	

PAINTS, OILS AND VARNISHES

National Lead Co.	White Lead
2015 Richmond Terrace, Port Richmond.	
Perry-Austen Mfg. Co.	Lacquer
Parkinson Avenue, Grasmere.	
Standard Varnish Works	Varnish
2589 Richmond Terrace, Port Richmond.	

PAPER, PAPER PRODUCTS AND PRINTING

- Louis De Jonge & Co.**.....Coated Paper
Tompkins Avenue, Clifton.
- Demec at-Herald**Newspaper and Job Printing
208 Bay Street, Tompkinsville.
- Louis Ettlinger & Son**.....Jewelry Boxes
947 Richmond Avenue, Graniteville.
- Richmond Borough Publishing & Printing Co.**...Publishing and Printing
16 Park Avenue, Port Richmond.
- The Richmond County Advance**.....Newspaper
1267 Castleton Avenue, West New Brighton.
- The Staten Islander**.....Newspaper
Staten Islander Building, Tompkinsville.
- The J. Willig Press**.....Printing
72 Gordon Street, Stapleton.

PUBLIC UTILITIES

- Baltimore & Ohio R. R.**.....Car Repair
St. George Yard, St. George.
- Carteret Ferry Corp.**.....Repair of Boats
Fort Richmond Turnpike, Linoleumville.
- City of New York Dept. of Plant & Structures**.....Ferry Repair
St. George.
- New York & Richmond Gas Co.**...Gas Generated, Gas Meters Repaired
Willow Avenue, Clifton.
- Richmond Light & R. R. Co.**.....Power Generated and Cars Repaired
92 Brook Street, Tompkinsville.
- Staten Island Rapid Transit Railway Co.**.....Car and Engine Repair
Bay Street, Clifton.

SHIPBUILDING AND REPAIRING

- Brewer Dry Dock Co.**
2933 Richmond Terrace, Mariners Harbor. ,
- A. C. Brown & Sons**
Foot of Amboy Avenue, Tottenville.
- John B. Caddell**
Foot of Broadway, West New Brighton.
- Stephen H. Cossey**
Foot of Henry Street, Tottenville.
- Johnson Shipyards Corp.**
2941 Richmond Terrace, Mariners Harbor.
- John Larsen**
Foot of Broadway, West New Brighton.
- Frank McWilliams, Inc.**
Foot of Burgher Avenue, West New Brighton.
- Nass & Keane**
Foot of Amboy Road, Tottenville.
- National Dry Dock & Repair Co.**
Foot of Bodine Street, West New Brighton.
- New York Harbor Dry Dock Co.**
200 Edgewater Street, Rosebank.
- Port Richmond Shipyard Corp.**
2269 Richmond Terrace, Port Richmond.

- P. Sanford Ross**
Richmond Terrace, Foot of Nicholas Street, Port Richmond.
- Standard Shipbuilding Corp.**
Shooters Island, Mariners Harbor.
- Staten Island Shipbuilding Co.**
Richmond Terrace, Mariners Harbor and West New Brighton.
- Tottenville Shipyard Co.**
Foot of Fisher Avenue, Tottenville.
- Townsend Repair Works, Inc.**
1511 Richmond Terrace, West New Brighton.
- Verdon & Co., Inc.**
Richmond Terrace, West New Brighton.

TEXTILES AND ALLIED PRODUCTS

- A. Arida & Co.**.....Kimonos and Bath Robes
36 Canal Street, Stapleton.
- Claysmith Co., Inc.**.....Finishers of Cotton Goods
84 Broadway, West New Brighton.
- Ellar Co.**.....Underwear
467 St. Marks Place, Tompkinsville.
- Miss T. Eib**.....Underwear
152 Canal Street, Stapleton.
- Empire State Silk Label Co.**.....Woven Labels
218 Taylor Street, West New Brighton.
- Fiering & Schoffel**.....Silk Waists
456 Richmond Terrace, New Brighton.
- Herrmann, Aukam & Co.**.....Handkerchiefs
54 Greenleaf Avenue, West New Brighton.
- S. Holowitz**.....Knee Pants
22 Bismarck Avenue, New Brighton.
- Hudson Waist Co.**.....Ladies' Waists
62 Britton Street, West New Brighton.
- Irving Mfg. Co.**.....Cotton Goods
23 Jersey Street, New Brighton.
- B. Kolchin**.....Bloomers
453 Richmond Terrace, New Brighton.
- Gasper Lafata**.....Knickerbockers
14 Bush Avenue, Mariners Harbor.
- The Monroe Handkerchief Works**.....Handkerchiefs
Tompkinsville.
- The Neatform Co.**.....Bandeaux and Brassieres
Main Street, Tottenville.
- The Normandy Waist Co.**.....Ladies' Waists
1398 Richmond Terrace, West New Brighton.
- Peterson, Palefsky & Stern, Inc.**.....Ladies' Coats and Suits
456 Richmond Terrace, New Brighton.
- Peters & Ustalo**.....Silk Kimonos
73 Johnson Avenue, Tottenville.
- The Rose Company**.....Children's Dresses
235 Jersey Street, New Brighton.
- Royal Tailoring Co.**.....Suits and Coats
68 Richmond Avenue, Port Richmond.
- Silver Knitting Mills**.....Underwear
79 Broad Street, Stapleton.

F. Silverman & Sons	Children's Dresses
210 Broadway, West New Brighton.	
B. Singer	Men's Trousers
111 Jersey Street, New Brighton.	
Spear Hat Mfg. Co., Inc.	Felt Hats
57 Johnson Avenue, Tottenville.	
Staten Island Embroidery Works	Lace and Embroidery
15 Pike Street, Tompkinsville.	
Staten Island Hand Embroidery Works	Embroidery
2045 Richmond Terrace, Port Richmond.	
Valco Mfg. Co.	Pajamas
181 Jewett Avenue, Port Richmond.	
Weargood Raincoat Co.	Raincoats
20 Bismarck Avenue, New Brighton.	

MISCELLANEOUS

American Linoleum Mfg. Co.	Linoleum
Linoleumville.	
John Bain & Sons	Print Blocks
West New Brighton.	
Barrett Nephews & Co.	Dyeing and Cleaning
84 Broadway, West New Brighton.	
Diamond Decorative Leaf Co.	Decorative Gold Leaf
710 Van Duzer Street, Stapleton.	
Stewart Dickson Mfg. Co.	Asbestos Packing
2 Sand Street, Stapleton.	
L. A. Dreyfus Co.	Artificial Rubber
Edgewater Street, Rosebank.	
Great Lakes Dredge & Dock Co.	Dredging
2705 Richmond Terrace, Mariners Harbor.	
John Kempf	Artificial Flowers
442 St. Marks Place, Tompkinsville.	
J. M. Lipset	Dental Supplies
31 Water Street, Stapleton.	
Macrae & Rose	Print Blocks and Rollers
412 Broadway, West New Brighton.	
Merritt & Chapman Derrick & Wrecking Co.	Wrecking
Dock Street, Stapleton.	
New York Model Boat Co.	Toy Boats
6200 Amboy Road, Pleasant Plains.	
Procter & Gamble Mfg. Co.	Soap
Richmond Terrace, Port Ivory.	
S. S. White Dental Mfg. Co. ..	Dental Instruments, Equipment and Supplies
Johnson Terrace, Prince's Bay.	
I. W. Wolf	Monuments
1123 Richmond Avenue, Graniteville.	
Zorn & Schrengauer	Wagons
143 Canal Street, Stapleton.	

